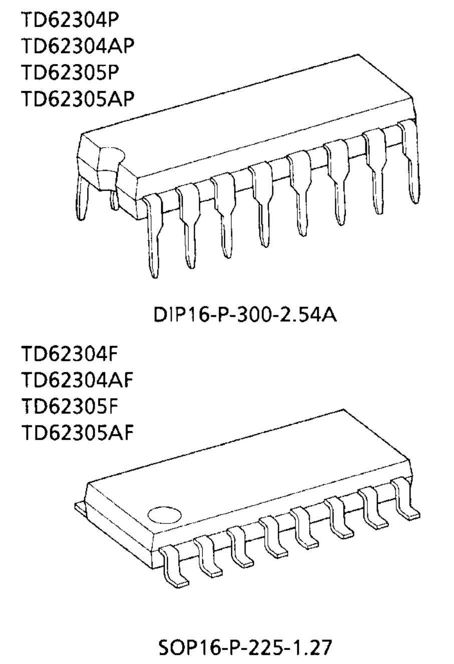
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62304P,TD62304AP,TD62304F,TD62304AF
TD62305P,TD62305AP,TD62305F,TD62305AF

7CH LOW ACTIVE DARLINGTON SINK DRIVER

The TD62304P/AP/F/AF and TD62305P/AP/F/AF are non−inverting transistor arrays, which are comprised of eight NPN darlington buffer-transistor output stages and PNP input stages.
These devices can be operated by source input voltage and are suitable for operations with a 5-V general purposed logic IC such as 5-V TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers.
Please observe the thermal condition for using.

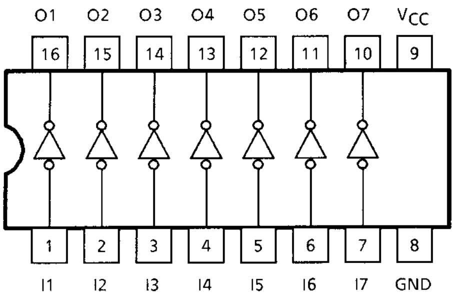


Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
SOP16−P−225−1.27 : 0.16 g (Typ.)

FEATURES

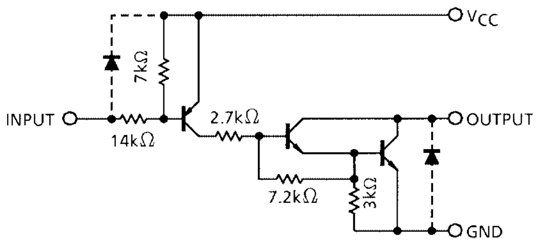
- Output current (single output) 500 mA (Max.)
- High sustaining voltage 35 V (TD62304P/F, 62305P/F) 50 V (TD62304AP/AF, 62305AP/AF) (Min.)
- Low level active input
- Input compatible with 5-V TTL and 5-V CMOS
- Package type-P, AP: DIP-16 pin
- Package type-F, AF: SOP-18 pin

PIN CONNECTION (TOP VIEW)

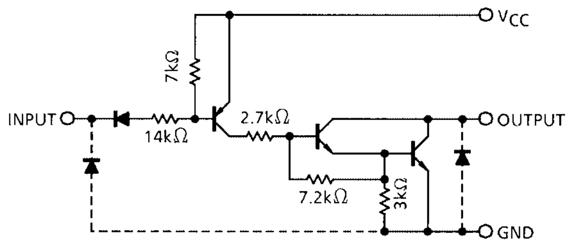


SCHEMATICS (EACH DRIVER)

TD62034P/AP/F/AF



TD62305P/AP/F/AF



Note: The input and output parasitic diodes cannot be used as clamp diodes.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTICS		SYMBOL	RATING	UNIT
Supply Voltage		V_{CC}	−0.5~7.0	V
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$	−0.5~35	V
	AF		−0.5~50	
	AP		−0.5~50	
Output Current		I_{OUT}	500	mA / ch
Input Voltage		V_{IN}	−22~V_{CC} +0.5	V
			−0.5~7 (Note 1)	
Input Current		I_{IN}	−10	mA
Power Dissipation	P	P_D	1.0	W
	AP		1.47	
	F, AF		0.625 (Note 2)	
Operating Temperature	P	T_{opr}	−30~75	°C
			−40~85	
Storage Temperature		T_{stg}	−55~150	°C

Note 1: TD62305P / AP / F / AF
Note 2: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

RECOMMENDED OPERATING CONDITIONS
(Ta = −40~85°C and Ta = −30~75°C for only Type−P)

CHARACTERISTIC		SYMBOL	CONDITION	MIN	TYP.	MAX	UNIT
Supply Voltage		V_{CC}	—	4.5	5.0	5.5	V
Output Sustaining Voltage	P, F	$V_{CE\ (SUS)}$	—	0	—	35	V
	AF			0	—	50	
	AP			0	—	50	
Output Current		I_{OUT}	DC 1 Circuit	0	—	350	mA / ch
	P		T_{pw} = 25 ms, duty = 10% 7 circuits	0	—	300	
	AP		T_{pw} = 25 ms, duty = 10% 7 circuits	0	—	350	
			T_{pw} = 25 ms, duty = 20% 7 circuits	0	—	200	
Input Voltage	TD62304P / AP / F / AF	V_{IN}	—	−20	—	V_{CC}	V
	TD62305P / AP / F / AF			0	—	5.5	
Power Dissipation	P	P_D	—	—	—	0.44	W
	AP		—	—	—	0.52	
	F, AF		(Note 1)	—	—	0.325	

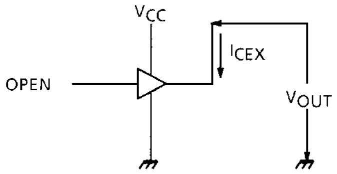
Note 1: On glass epoxy PCB (30 × 30 × 1.6 mm Cu 50%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

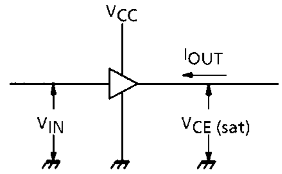
CHARACTERISTIC		SYMBOL	TEST CIR−CUIT	TEST CONDITION		MIN	TYP.	MAX	UNIT
Output Leakage Current	P / F	I_{CEX}	1	V_{CC} = 5.5 V V_{IN} = 0 V	V_{OUT} = 35 V Ta = 75°C	—	—	−100	μA
					V_{OUT} = 50 V Ta = 85°C				
Output Saturation Voltage		$V_{CE\ (sat)}$	2	V_{CC} = 4.5 V I_{OUT} = 350 mA	V_{IN} = $V_{IN\ (ON)}$ MAX.	—	1.4	2.0	V
Input Current	(Output On)	$I_{IN\ (ON)}$	3	V_{CC} = 5.5 V, V_{IN} = 0.4 V		—	−0.32	−0.45	mA
				V_{CC} = 5.5 V, V_{IN} = −20 V		—	—	−2.6	
	(Output Off)	$I_{IN\ (OFF)}$	4	—		—	—	−40	μA
Input Voltage (Output On)	TD62304	$V_{IN\ (ON)}$	5	—		—	—	V_{CC} −2.8	V
	TD62305					—	—	V_{CC} −3.7	
Supply Current	(Output On)	$I_{CC\ (ON)}$	6	V_{CC} = 5.5 V, V_{IN} = 0 V		—	17	22	mA
	(Output Off)	$I_{CC\ (OFF)}$	6	V_{CC} = V_{IN} = 5.5 V		—	—	100	μA
Turn−On Delay	P, F	t_{ON}	7	V_{CC} = 5 V, C_L = 15 pF	V_{OUT} = 35 V R_L = 87.5 Ω	—	0.1	—	μs
	AP, AF				V_{OUT} = 50 V R_L = 125 Ω				
Turn−Off Delay	P, F	t_{OFF}			V_{OUT} = 35 V R_L = 87.5 Ω	—	3	—	
	AP, AF				V_{OUT} = 50 V R_L = 125 Ω				

TEST CIRCUIT

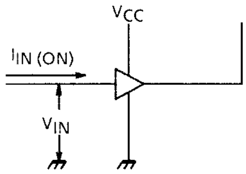
1. I_{CEX}



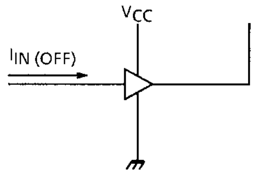
2. h_{FE}, $V_{CE\ (sat)}$



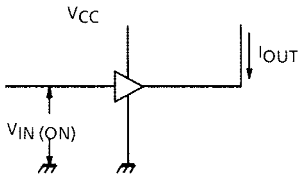
3. $I_{IN\ (ON)}$



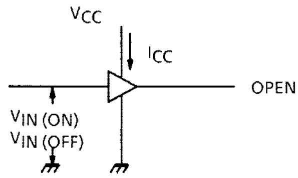
4. $I_{IN\ (OFF)}$



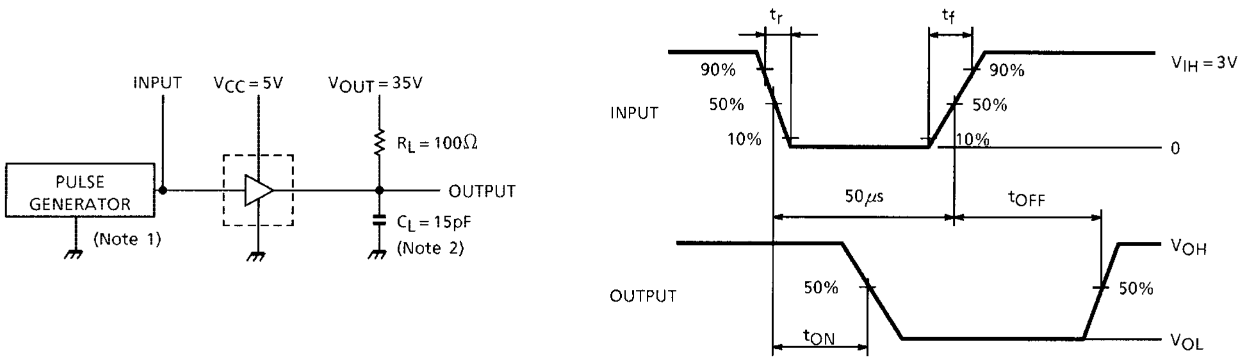
5. $V_{IN\ (ON)}$



6. I_{CC}



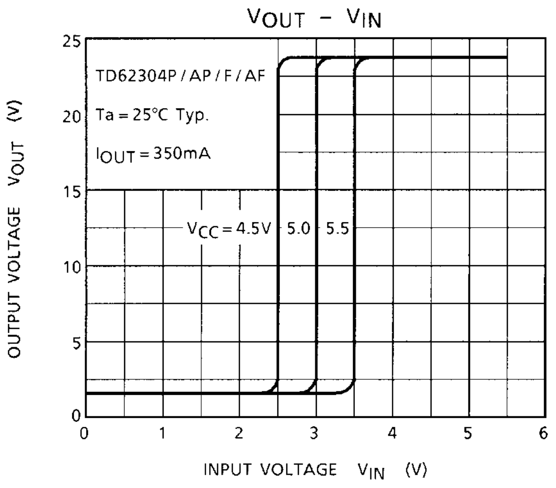
7. t_{ON}, t_{OFF}

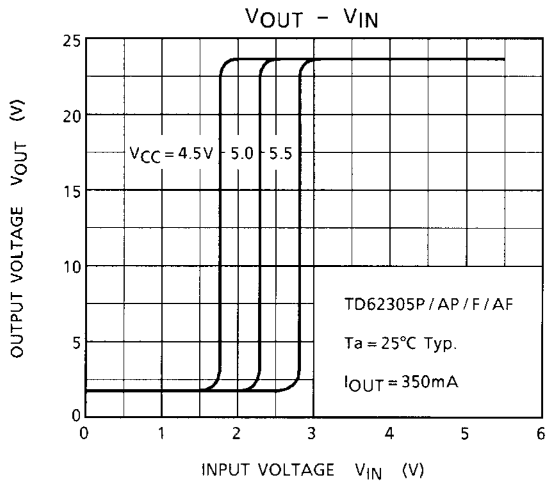


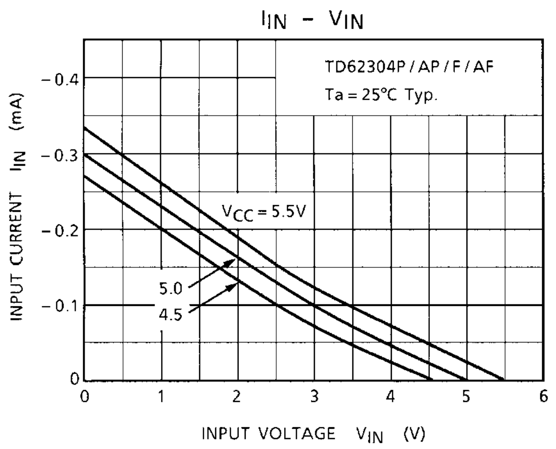
Note 1: Pulse Width 50 μs, duty cycle 10%
Output impedance 50 Ω, $t_r \leq$ 10 ns, $t_f \leq$ 5 ns
Note 2: C_L includes probe and jig capacitance.

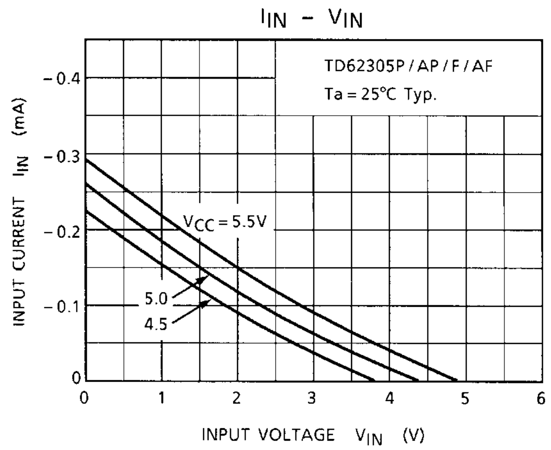
PRECAUTIONS for USING

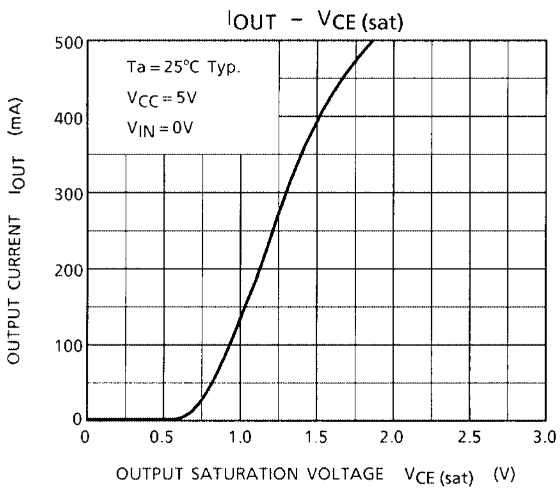
This IC does not include built-in protection circuits for excess current or overvoltage.
If this IC is subjected to excess current or overvoltage, it may be destroyed.
Hence, the utmost care must be taken when systems which incorporate this IC are designed.Utmost care is necessary in the design of the output line, V_{CC} and GND line since IC may be destroyed due to short−circuit between outputs, air contamination fault, or fault by improper grounding.

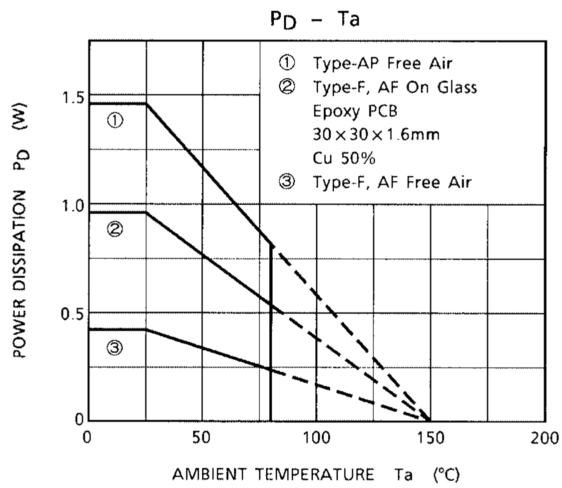

VOUT – VIN
TD62304P / AP / F / AF
Ta = 25°C Typ.
IOUT = 350mA
VCC = 4.5V
5.0
5.5
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)

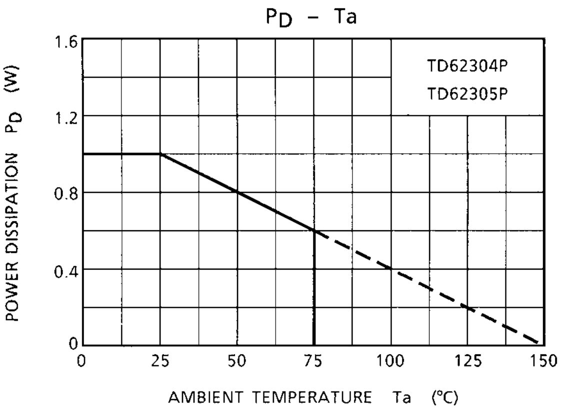

VOUT – VIN
VCC = 4.5V
5.0
5.5
TD62305P / AP / F / AF
Ta = 25°C Typ.
IOUT = 350mA
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)


IIN – VIN
TD62304P / AP / F / AF
Ta = 25°C Typ.
VCC = 5.5V
5.0
4.5
INPUT CURRENT IIN (mA)
INPUT VOLTAGE VIN (V)


IIN – VIN
TD62305P / AP / F / AF
Ta = 25°C Typ.
VCC = 5.5V
5.0
4.5
INPUT CURRENT IIN (mA)
INPUT VOLTAGE VIN (V)

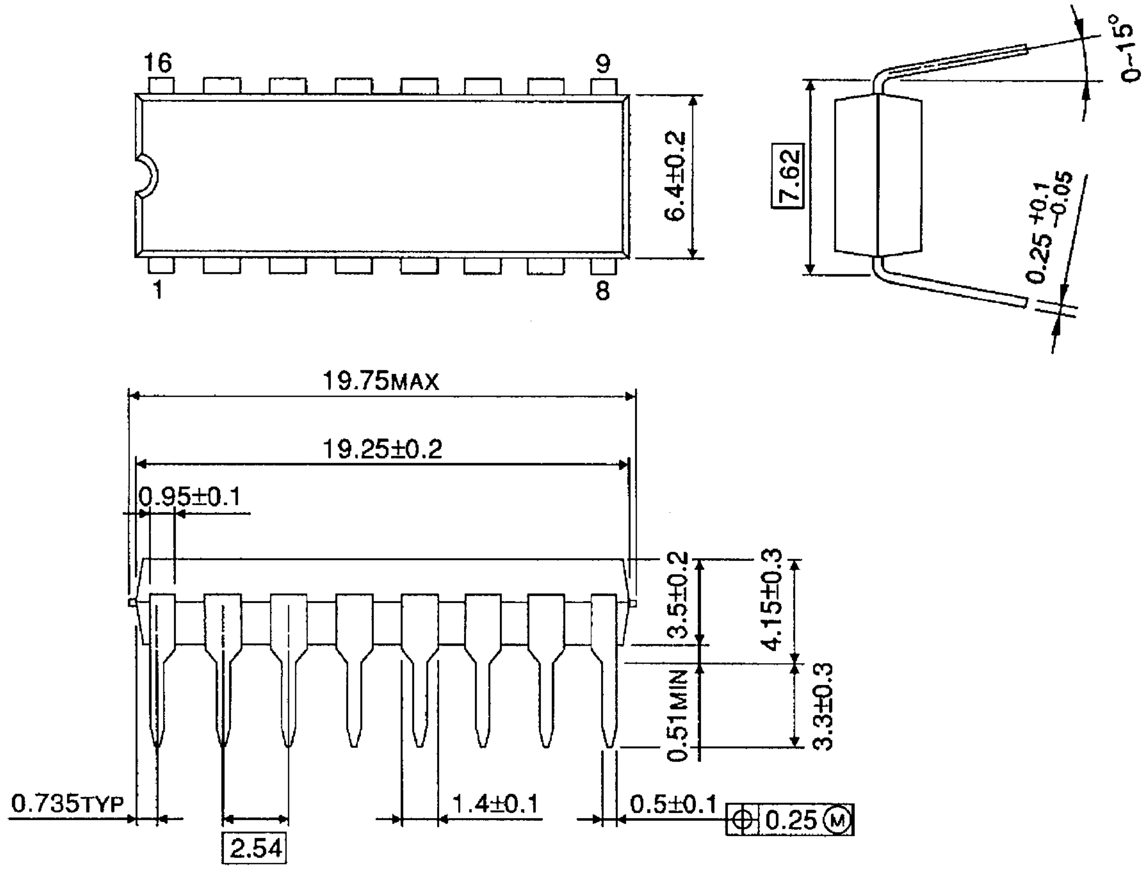

IOUT – VCE (sat)
Ta = 25°C Typ.
VCC = 5V
VIN = 0V
OUTPUT CURRENT IOUT (mA)
OUTPUT SATURATION VOLTAGE VCE (sat) (V)


PD – Ta
① Type-AP Free Air
② Type-F, AF On Glass Epoxy PCB 30 × 30 × 1.6mm Cu 50%
③ Type-F, AF Free Air
POWER DISSIPATION PD (W)
AMBIENT TEMPERATURE Ta (°C)


PD – Ta
TD62304P
TD62305P
POWER DISSIPATION PD (W)
1.6
1.2
0.8
0.4
0
0 25 50 75 100 125 150
AMBIENT TEMPERATURE Ta (°C)

PACKAGE DIMENSIONS

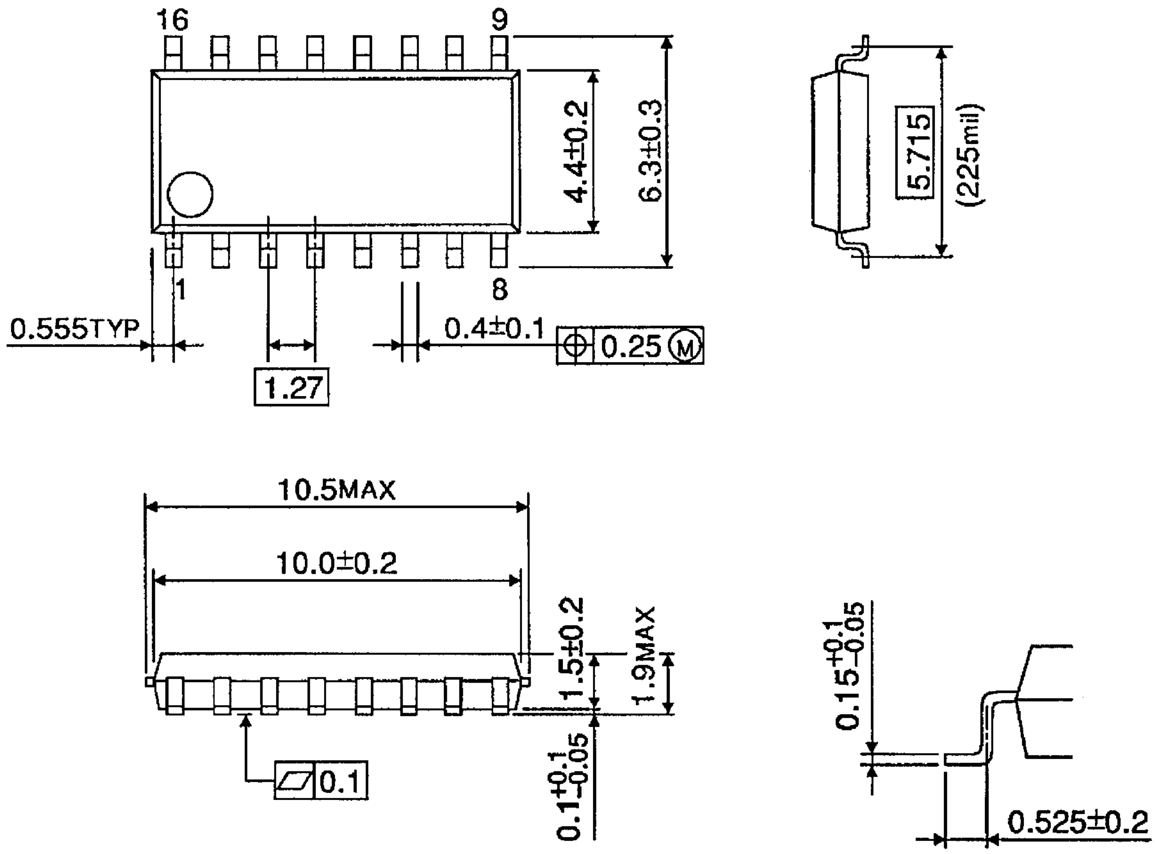
DIP16−P−300−2.54A Unit : mm



Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

SOP16−P−225−1.27 Unit : mm



Weight: 0.16 g (Typ.)

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000707EBA

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